

What is claimed is:

- 5 1. A two band imaging system, the two band system having an optical axis, the two band imaging system comprising:
 - a. two focal plane array detectors;
 - b. a beam splitter, the beam splitter disposed within the system at an angle to the optical axis such that light entering the system is split and is simultaneously directed to each of the two focal plane array detectors; and
 - 10 c. an enclosure, the two focal plane array detectors and beam splitter disposed within the enclosure.
- 15 2. The two band imaging system of claim 1, wherein the beam splitter is a dichroic beam splitter.
3. The two band imaging system of claim 2, wherein the two band imaging system further comprising two filters of known band-pass, each filter placed in front of a corresponding focal plane array detector, the two filters disposed within the enclosure.
- 20 4. The two band imaging system of claim 3, wherein the two band imaging system further comprising an image processor for providing real time absolute radiance imagery, the image processor simultaneously converting the light entering the two focal plane array detectors into an absolute radiance image.

5. The two band imaging system of claim 4, wherein the two filters of known band-pass are selected from the group consisting of a short wave infrared filter, a midwave infrared filter, a long wave infrared filter, and an UV-Visible-Near IR range filter.
- 5 6. The two band imaging system of claim 4, wherein the two focal plane array detectors are two infrared focal plane array detectors.
7. A two band imaging system, the two band system having an optical axis, the two band imaging system comprising:
- 10 a. a mounting assembly;
- b. two infrared focal plane array detectors, the two infrared focal plane array detectors mounted on the mounting assembly;
- c. two filters of known band-pass, each filter placed in front of a corresponding infrared focal plane array detector;
- 15 d. a dichroic beam splitter, the dichroic beam splitter disposed within the system at an angle to the optical axis such that light entering the system is split and is simultaneously directed to each of the two infrared focal plane array detectors;
- e. a Dewar vessel, the two infrared focal plane array detectors, the two filters of known band-pass and the dichroic beam splitter disposed within the Dewar vessel; and
- 20 f. an image processor for providing real time absolute radiance imagery, the image processor simultaneously converting the light entering the two infrared focal plane array detectors into an absolute radiance image.
8. The two band imaging system of claim 7, wherein the two infrared focal plane array detectors
- 25 are substantially perpendicular to each other.

9. The two band imaging system of claim 8, wherein one of the two filters of known band-pass is a short wave infrared filter.

10. The two band imaging system of claim 9, wherein the other filter of known band-pass is a
5 midwave infrared filter.

11. The two band imaging system of claim 10, wherein an optic plate for correcting optical distortion of light is disposed within the system.

10 12. The two band imaging system of claim 11, wherein between the optic plate is disposed between the midwave infrared filter and dichroic beam splitter.

13. A two band imaging system, the two band imaging system having an optical axis, the two band imaging system comprising:

- 15 a. a mounting assembly, the mounting assembly being a single monolithic mounting assembly;
- b. two infrared focal plane array detectors, the two infrared focal plane array detectors mounted on the mounting assembly wherein the two infrared focal plane array detectors are substantially perpendicular to each other;
- 20 c. two filters of known band-pass, each filter placed in front of a corresponding infrared focal plane array detector, one of the two filters of known band-pass is a short wave infrared filter, while the other filter of known band-pass is a midwave infrared filter;
- d. a dichroic beam splitter, the dichroic beam splitter disposed within the system at an angle to the optical axis such that light entering the system is split and is
25 simultaneously directed to each of the two infrared focal plane array detectors;

- e. an optic plate for correcting optical distortion, the optic plate disposed between the midwave infrared filter and the dichroic beam splitter;
- f. a Dewar vessel, the two infrared focal plane array detectors, the two filters of known band-pass, the dichroic beam splitter, and the optic plate disposed within the Dewar vessel; and
- g. an image processor for providing real-time absolute radiance imagery, the image processor simultaneously converting the light entering the two infrared focal plane array detectors into an absolute radiance image.

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14. The two band imaging system of claim 13, wherein the dichroic beam splitter disposed within the system at about a 45 degree angle to the optical axis.

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15. The two band imaging system of claim 14, wherein the two infrared focal plane array detectors are selected from the group consisting of indium antimonide type detectors and cadmium telluride type detectors.

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16. The two band imaging system of claim 15, wherein the image processor utilizes an algorithm that relies on imaging system characteristics alone.

17. The two band imaging system of claim 16, wherein the image processor utilizes the following equations to create real time absolute radiance imagery:

(a) $S(\text{Total}) - (S(\text{FPA}) + S(n)) * R + L(n) - L(\text{Optics}) = L(\text{Scene})$; and

(b) $(S(\text{Total}) - (S(\text{FPA}) + S(n)) * R + L(n) - L(\text{Scene})) = L(\text{Optics})$.

18. The two band imaging system of claim 17, wherein the imaging system further comprising an imaging optic for passing light into the imaging system, the Dewar vessel disposed behind the imaging optic.

5 19. The two band imaging system of claim 18, wherein the optic plate is a cylindrical optic plate.

20. The two band imaging system of claim 18, wherein the optic plate is a flat tilt plate.

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